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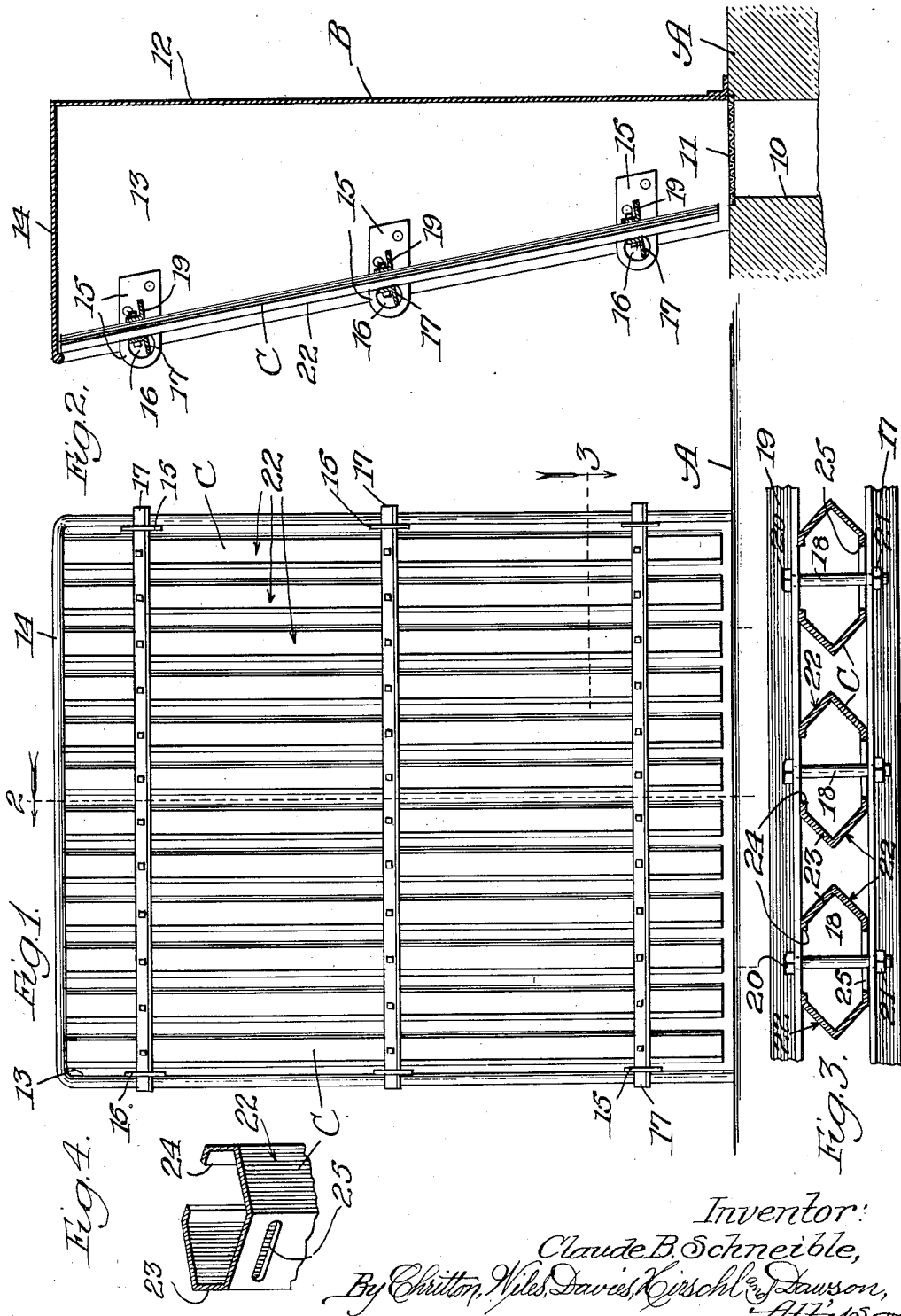
C. B. SCHNEIBLE

2,277,271

VENTILATOR FOR DUST CREATING OPERATIONS

Filed Oct. 21, 1938

2 Sheets-Sheet 1



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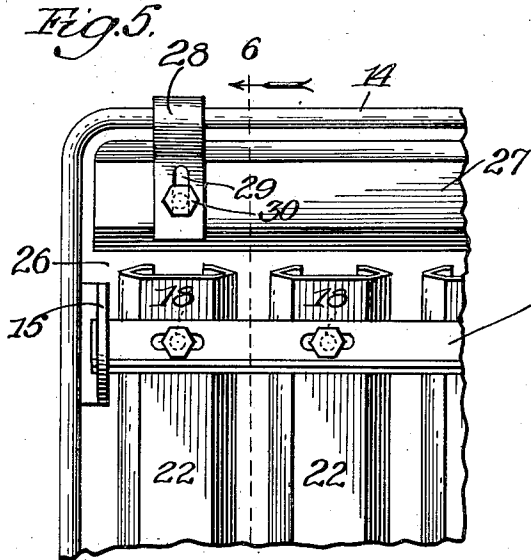
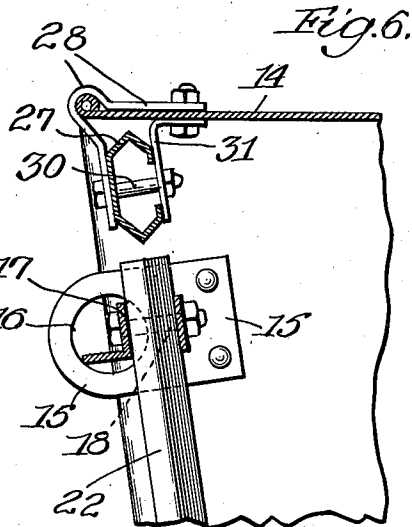
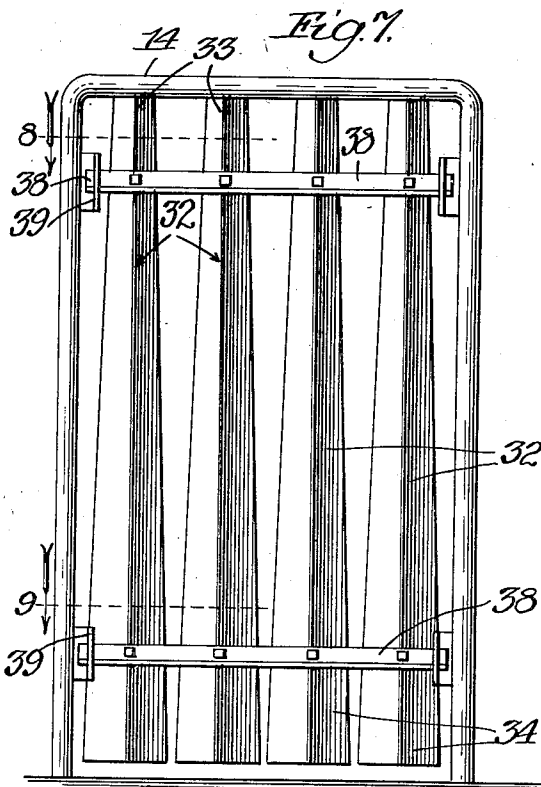
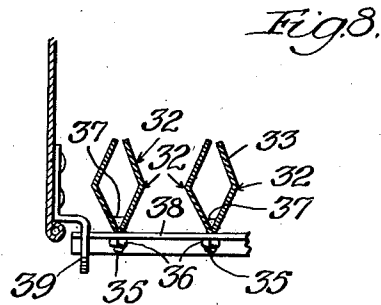
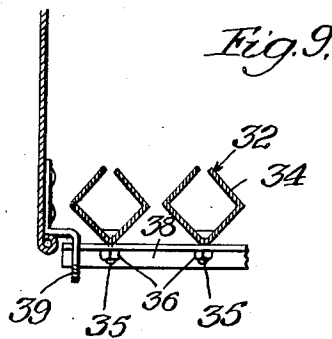
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VENTILATOR FOR DUST CREATING OPERATIONS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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VENTILATOR FOR DUST CREATING OPERATIONS

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Application October 21, 1938, Serial No. 236,337

6 Claims. (Cl. 98—115)

This invention relates to ventilators for manufacturing operations creating dust, fumes, sprays, etc. The apparatus is particularly useful in connection with the removal of soot, dust and small fragments adhering to parts removed from heating or treating furnaces, permitting the use of overhead cranes, etc. It is useful also in shake-outs for foundries, paint spray booths, granite and stone cutting, bag filling, as in the package of lime, etc., chemical operations, and other similar applications.

An object of the present invention is to provide a simple structure which may be installed upon the floor, walls, or platforms in foundries, etc., to permit the removal of smoke, soot, sand, and dust particles, etc. from parts removed from furnaces, treating ovens, and other sources. A further object is to provide means whereby the opening of a suction box may be effectively controlled so as to efficiently remove foreign particles from objects, the box being horizontal, vertical, or arranged at any angle. A further object is to provide a louver structure for a suction opening by which the suction can be directed through the adjustment of the ribs of the louver so as to produce a suction suited to the conformation or character of the objects. A further object is to provide a louver structure for controlling a suction opening wherein the individual slats or ribs of the louver are provided with rounded or pointed ends whereby air is permitted to flow between the ribs with a minimum of friction. The structure is extremely simple, occupying little space, and permitting the use of overhead cranes or lifting devices. Other objects and advantages will appear as the specification proceeds.

The invention is illustrated, in a preferred embodiment, by the accompanying drawings, in which—

Figure 1 is a front view in elevation of apparatus embodying my invention; Fig. 2, a vertical sectional view, the section being taken as indicated at line 2 of Fig. 1; Fig. 3, an enlarged transverse sectional view, the section being taken as indicated at line 3 of Fig. 1; Fig. 4, a perspective and sectional view of one of the ribs showing the horizontal slot in the front portion thereof and the vertical slot in the rear portion thereof; Fig. 5, a broken front view in elevation of a modified form of apparatus; Fig. 6, a sectional detail view, the section being taken as indicated at line 6 of Fig. 5; Fig. 7, a front view in elevation of another modified form of apparatus; Fig. 8, a transverse sectional view, the section being

taken as indicated at line 8 of Fig. 7; and Fig. 9, a transverse sectional view, the section being taken as indicated at line 9 of Fig. 7.

In the illustration given, A designates a floor or platform provided with a suction passage 10 communicating with a suction fan or device (not shown). The opening of the passage is covered with a screen 11.

B designates a casing or housing closed on three sides but provided with an open front side.

C designates a louver structure which controls the open front side of the box or housing B.

The housing B may be of any suitable shape or construction. In the illustration given, it is provided with a vertical rear wall 12 and side walls 13 which are somewhat fan-shaped, providing a front edge which inclines upwardly and forwardly. The top of the casing is closed by the wall 14. The side walls 13 are provided with metal straps 15 which have free forwardly extending portions, each provided with an opening 16.

The louver structure C is preferably formed as follows. Angle iron cross beams 17 are extended through the openings 16 of the straps 15, as shown more clearly in Figs. 1 and 2. Bolts 18 extend through the vertical flanges of the angle irons 17 and through rearwardly disposed supporting angle irons 19, as shown more clearly in Fig. 3. The fixed head 20 of the bolt 18 lies adjacent the rear end of angle iron 19. The forward end of each bolt is threaded to receive a removable nut 21.

Between the angle irons and carried by the bolts 18 are hollow slats or ribs 22.

Each of the ribs 22 is preferably hollow with pointed or inclined ends 23, the rear side of the rib being left open to form a vertical slot 24. The front side of the rib is provided with a series of spaced horizontal slots 25 aligned with the bolts 18. Instead of having the ends of the ribs pointed as indicated at 23, the ends may be rounded or otherwise formed so as to provide low-resistance orifices. With the ends shaped as illustrated or rounded, a Venturi effect is produced providing very little resistance to the inflow of air carrying the foreign particles. By the use of the word "inclined," as set out in the claims hereinafter, I mean to include low-resistance surfaces which may be inclined either with straight or rounded surfaces so as to reduce very greatly the resistance to the inflow of air.

In the construction shown in Figs. 5 and 6, the hollow ribs 22 terminate below the top of the opening so as to provide the hollow space 26 be-

tween the top of the ribs and the top of the casing 14. This space, which runs at right angles to the ribs 22, I prefer to control by a horizontal rib 27 of the same construction as ribs 22. The rib 27 is supported by a metal strap 28 provided with a vertical slot 29 through which extends the bolt 30. A second bracket 31 is suspended from the casing 14 and supports the rear end of the bolt 30. With this structure, the hollow rib 27 can be adjusted vertically so as to provide a small opening between the rib and the top portions of ribs 22 or a large opening between the same. It will be understood that the arrangement and inclination of the various ribs can be changed in a great variety of ways, the majority or all of them being arranged in a horizontal position or the majority or all of them being arranged in a vertical position.

Another form in which the ribs may be effectively arranged is illustrated in Figs. 7, 8 and 9. Here the hollow ribs 32 are formed of malleable metal which permits them to be tapered toward the upper end 33 and widened at the lower end 34. The conformation of the ribs near the ends mentioned is illustrated in Figs. 8 and 9. The ribs are supported by means of bolts 35 having heads 36 and conical inner ends 37, the bolts passing through a single transverse supporting beam 38 supported at its ends in brackets 39.

In the adjustment provided by this structure, the widening or narrowing of the rib is effected by pressing or flaring the malleable metal. Thus, adjustability is provided not only with respect to lateral shifting but also with respect to the shape of the air spaces between the ribs.

Operation

In the operation of the device, products to be cleaned are deposited by cranes or other lifting material on the floor or platform A in the front of the inclined louver structure C. By having the louver structure C extending forwardly at its upper end, a more complete and enveloping suction is obtained while at the same time there is practically no interference with the overhead cranes or other lifting mechanism. If the object is rather small and extends over only a portion of the structure, the louver ribs may be shifted so as to provide operative suction spaces adjacent the object and arranged so as to produce the sharpest and most effective suction for removing the foreign material therefrom. If there are two objects, one near each end of the apparatus, the ribs may be pushed together toward the center and opened more near the sides so as to provide a suction where it is most effective for the two objects. It will be obvious that the ribs can be adjusted widely so as to suit the type of object from which foreign particles are to be removed.

In the shifting of the hollow ribs 22, all that is necessary is for the operator to loosen the front nut 21. He can then shift the hollow rib 22 between the angle irons 17 and 19 within the limits of the horizontal slot 25. By this means, it is possible to close off areas of the front while rather widely opening other areas at the front of the louver structure. Further, the shifting of the end ribs enables the angle iron ends to be withdrawn from the strap openings 16. Likewise, when the angle irons are inserted into position, they may be locked therein against removal by the end louver ribs.

The soot, smoke, and other foreign particles pass within the tapered box or housing B and

pass downwardly through the screen 11 and outwardly through passage 10 toward the suction device, means being provided therebetween (not shown) for removing the foreign particles, as in well known air cleansing apparatus.

The louver structure not only permits the shifting of the louver ribs for obtaining the most effective suction for the conformation of a particular object, but also the structure greatly reduces the suction required, and the shape of the individual louver ribs facilitates the flow of air therebetween and the carrying of foreign particles into the housing B.

The structure shown in the modifications of Figs. 5 to 9 inclusive illustrate different means for modifying the air spaces. As shown in Figs. 5 and 6, the ribs may run in opposite directions to each other and the adjustment considerably varied through this and other angular relationships. A wider possibility of adjustment is provided in the structure shown in Figs. 7 to 9 where the shape of the malleable hollow ribs 32 can be changed so that the individual rib varies in its contour from one end to the other.

With the various structures shown, the velocities along different portions of the louver structure can be changed and controlled. For example, the velocity may be greatly increased at the top and bottom of the structure and made low in the central portion thereof, or the louver structure may be adjusted to require high velocities in the center of the louver structure and low velocities along its edges. Further, adjustment permits high velocities along one side of the louver structure and low velocities along the other side. One corner of the louver structure may be adjusted to provide extremely high velocities while the remainder of the structure requires low velocities. In view of the fact that in the various industrial operations heretofore mentioned the velocity requirements for different articles change, it is extremely important that the structure be so adjustable that with a minimum of suction, sufficiently effective velocities are obtained for removing dust, smoke, etc. from the particular articles.

While in the foregoing description, I have set forth a specific structure and have described the parts in detail, it will be understood that such details may be modified widely without departing from the spirit of my invention.

I claim:

1. In suction apparatus of the character set forth, a housing having one side open, suction means communicating with said housing, supporting beams adjacent said open side, and Venturi ribs supported by said beams, said ribs being provided with horizontal slots, members carried by said supporting beams and slidably received within said slots of said ribs whereby said ribs are adjustable to vary the spaces therebetween.

2. In suction apparatus of the character set forth, a housing having side walls inclined forwardly and upwardly, rear and top walls, a suction passage communicating with the bottom of said housing, and a louver structure supported within the open front side of said housing with a space between the edges of said louver structure and the walls of said housing, said louver structure comprising supporting beams and ribs supported by said beams, said ribs being provided with horizontal slots, members carried by said supporting beams and slidably received within said slots of said ribs whereby said ribs are adjustable to vary the spaces therebetween and be-

tween said louver structure and walls of said housing, each of said ribs having its sides tapered toward the sides of the next adjacent ribs to provide Venturi-like spaces therebetween.

3. In suction apparatus of the character set forth, a housing having one side open, suction means communicating with said housing, supporting beams adjacent the open side of said housing, and ribs supported by said beams, each of said ribs having its sides tapering rearwardly from a forward point of junction and toward the sides of the next adjacent ribs to provide Venturi-like spaces therebetween, said ribs being provided with slots, members carried by said supporting beams and slidably received within said slots of said ribs whereby said ribs are adjustable to vary the spaces therebetween.

4. In suction apparatus of the character set forth, a housing having one side open, suction means communicating with said housing, supporting beams adjacent said open side, Venturi ribs, and means securing said Venturi ribs to said beams, permitting relative movement of said ribs with respect to said beams.

5. In suction apparatus of the character set forth, a housing having side walls inclined for-

wardly and upwardly, rear and top walls, a suction passage communicating with the bottom of said housing, a louver structure supported within the open front side of said housing with a space between the edges of said louver structure and the walls of said housing, said louver structure comprising cross beams and hollow ribs, said ribs being provided with a rear vertical slot and with front horizontal slots, and bolts extending through said slots and said cross beams, said bolts being adapted to be loosened to permit lateral adjustment of said ribs, and suction means communicating with said housing, each of said ribs having its sides tapered towards the sides of the next adjacent ribs to provide Venturi-like spaces therebetween.

6. In suction apparatus of the character set forth, a housing having one side open, suction means communicating with said housing, supporting beams adjacent said open side, and a plurality of Venturi ribs supported by said beam across said open side, each of said ribs having its sides tapered towards the sides of the next adjacent ribs to provide Venturi-like spaces therebetween.

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